

Consequences and Management of Neglected Avulsion Injury

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Abstract

Traumatic injuries are the most common dental problems after dental caries occurring in children, especially in the early teenage years. Such injuries include tooth fracture with or without pulp involvement, intrusion, extrusion, and avulsion. Of these, avulsion is one of the most severe dental injuries and has a major psychological impact on the child. One of the complications of avulsion may include space loss due to mesial migration and rotations in the adjacent teeth which may require orthodontic correction following which immediate chairside replacement may be done with a long-term provisional restoration before the placement of final implant prosthesis after stoppage of bone growth and development. This article presents an innovative, affordable chairside procedure in which multipurpose fiber-reinforced composite is used to replace a single avulsed anterior tooth.

Keywords: Avulsion, case reports, central incisors, fiber-reinforced composite, provisional restoration, trauma

INTRODUCTION

Traumatic injuries to teeth and their supporting structures in children pose a treatment challenge to the general dental practitioner. Avulsions are a significant traumatic injury presenting in general dental practice and require prompt treatment and follow-up care. If appropriate timely care is not taken, it may lead to space loss and rotations of the remaining adjacent teeth. Later, as these children reach the early adolescent phase, these defects become more noticeable resulting in psychological trauma to the child which may motivate the patient to visit a dental practitioner for prompt treatment and correction to restore the esthetics.^[1]

Since such patients are still in their growing phase, the final restorations such as implant assisted or a fixed/removable prosthesis cannot be given. Hence, an alternative long-term provisional restoration needs to be given to restore esthetics until the completion of bone growth. This paper presents a case report outlining the treatment following complete avulsion of immature permanent teeth followed by complications of space loss by simple orthodontic correction and final replacement of the missing tooth with an interim provisional replacement before implant replacement using fiber-reinforced composite (FRC) resin technology.

CASE REPORT

A 12-year-old girl was referred for dental treatment with a history of trauma due to a fall resulting in tooth loss 1.5 years back. The patient desired esthetic rehabilitation of the missing tooth. There was no relevant medical history and the patient had no complaint of pain. On examination, it was seen that 11 was missing with substantial space loss due to mesial migration of 12 and 21 [Figure 1 and 2]. The second premolars were slightly mesially rotated. Orthopantomogram was taken to confirm that no tooth fragments were left in the region of tooth loss and to evaluate the periapical status of adjacent teeth. Electric pulp testing was done for 12 and 21. They were found to be vital and hence no treatment was done for the same.

Orthodontic corrections involved derotation of the second premolars on both sides and space regaining in the anterior avulsed tooth region was done by correction of the tilted incisors and closure of spaces between the teeth using conventional fixed orthodontics with the 018 MBT prescription

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Figure 1: Preoperative extraoral front view.



Figure 2: Preoperative intraoral photograph.



Figure 3: Intraoperative photograph with open coil spring.



Figure 4: Intraoperative photograph with open coil spring after space regaining.



Figure 5: Intraoperative photograph with open coil spring after space regaining.



Figure 6: Intraoperative photograph with E - chain.

[Figures 3-6]. The initial space available at the 1st visit between 21 and 12 was 5 mm while the final space obtained was 9 mm which was equivalent to the mesiodistal width of 21 [Figure 7].

This was followed by replacement of the missing tooth using FRC. The steps included debonding of the brackets followed by oral prophylaxis to remove the excess composite and

debris followed by proper isolation using cotton rolls, etching of lingual surfaces of 21, 22, and 12 application of bonding agent, placement of the FRC in the form of a single horizontal band connecting 12, 21, and 22 and two vertical bands in 11 region, followed by composite built up to give the final crown form of 11 [Figures 8-10]. Care was taken that after finishing and polishing, the appliance had self-cleansing with smooth margins and no undercuts. Instructions were given to the patient for postoperative care which included proper oral hygiene instructions and home care. The patient was instructed not to chew on hard or sticky foodstuff in the anterior region. Recall visits were planned at 1 week and 1 and 6 months.



Figure 7: Photograph after completion of orthodontic space regaining.



Figure 9: Intraoral postoperative photograph.

The patient was satisfied with the esthetic outcome of the treatment modality. No crack propagation, fractures, or damage around soft and hard tissues were observed in the follow-up appointments, and the tooth remained asymptomatic.

DISCUSSION

Traumatic dental injuries (TDIs) are commonly observed in the children and young adults. They comprise 5% of all injuries.^[1] Among all the TDIs, avulsion of permanent anterior teeth is seen in 0.5%–3%.^[2] If the treatment is delayed, the adjacent teeth drift into the edentulous space leading to space loss, midline shift, rotation, and drifting which gives an unesthetic appearance and may result in psychological trauma.

The management of anterior tooth loss in the young growing children is always challenging. The selection of the appliance for anterior region is of utmost importance in the young children. The drawback of any removable appliance is patient's compliance because of which their effects are usually unsatisfactory. Their fitting keeps changing with frequent removal and insertion, causing excessive pressure on the teeth and mucosal irritation.^[3,4]

The advantages of fixed appliances over the removable appliances are minimal discomfort and reduced need for patient cooperation. However, a fixed partial denture (FPD) cannot be given in this patient as the pulp chambers are large in young permanent teeth, and tooth preparation may warrant unnecessary root canal treatment of the healthy adjacent teeth. Also, in the case of FPD for the replacement of 11,



Figure 8: Fibre reinforced composite placement.



Figure 10: Extraoral postoperative photograph front view.

it is highly recommended that 13 also should be involved whose esthetic fabrication is difficult. Also, implants cannot be given in growing patients due to constant changing pattern of maxillary and mandibular dentoalveolar region, which may ultimately lead to failure of the implant.^[5] Hence, a resin preimpregnated glass fiber was used, with composite built up to act as a functional space maintainer.

Evidence seems to suggest that a short course of orthodontic treatment in the mixed dentition may improve function and esthetics and remain relatively stable often the appliance is removed.^[3]

Various alternative techniques were advocated for replacing the missing permanent tooth.^[6-8] Reinforcement fibers have been shown to increase the flexural strength and fracture toughness of composite resin restorations.^[9] Since the early 1990s, a Leno Woven polyethylene ribbon (FRC) has been used successfully for the replacement of missing teeth.^[10] The fibers are made for chairside use in a single appointment procedure that requires no special treatment preparation or instrumentation.

CONCLUSION

Early loss of anterior permanent tooth might lead to the psychological impact on child development. Management of this could be more valuable in the early age. The chairside FRC prostheses described in this clinical report offer a fast,

minimally invasive approach for esthetic, interim tooth replacement that combines the benefits of the FRC resin material for a functional and durable result.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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